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10/711,809	10/06/2004	James E. Brooks	22.1552	5808

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ROSHARON, TX 77583

EXAMINER

DAVID, MICHAEL D

ART UNIT	PAPER NUMBER
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3641

NOTIFICATION DATE	DELIVERY MODE
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ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No. 10/711,809	Applicant(s) BROOKS ET AL.	
	Examiner MICHAEL D. DAVID	Art Unit 3641	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 22 April 2010.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-22, 28-31 and 49-78 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-22, 28-31 and 49-78 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 06 December 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

The following is a Final Office action in response to communications received on 4/22/2010 and phone discussions with applicant's representative, Mr. Fred Pruner. Claims 1, 29, and 49 have been amended. New claims 71-78 have been added. Therefore claims 1-22, 28-31, and 49-78 are pending and addressed below.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1 and 8, 49, and 56 are rejected under 35 U.S.C. 102(b) as being anticipated by Liu (US Patent No. 6470803 B1).

Regarding claim 1, Liu discloses a detonator assembly (detonator apparatus – abstract), comprising: a capacitor (106, 100 – fig. 6); an initiator (bridgewire 54 – fig. 2, 3) electrically connected to the capacitor, (all of the components are mechanically and electrically connected to one another by wire 78) the initiator being bonded or fused to the capacitor (the initiator or bridgewire 54 is a component within detonator 42; the capacitor 106, 100 is part of the blasting machine 32; since the blasting machine 32 and

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the detonator 42 are connected to one another by wireline 30 and detonating cord 40, they are “bonded” or “fused” to one another and therefore the initiator 54 and capacitor 106 or 100 meet the recited broad limitations of being “bonded” or “fused” to one another – fig. 1; col. 7 lines 44-48); a transformer (80 – fig. 3a; 152 – fig. 7) mechanically and electrically connected to the capacitor (all the components are mechanically and electrically connected to one another); and an addressable chip (chip 92 – fig. 6) mechanically and electrically connected to the transformer, wherein the capacitor, initiator, transformer, and addressable chip form a unified integrated detonating unit. Additionally, regarding the limitation of “the initiator being bonded or fused to the capacitor”, see the rejection of claim 49 below. Regarding the newly added limitation “adapted to respond to a command communicated from a remote source to activate an explosive”, it has been held that the recitation that an element is “adapted to” perform a function is not a positive limitation but only requires the ability to so perform. It does not constitute a limitation in any patentable sense. *In re Hutchinson*, 69 USPQ 138. In the instant case, the detonating unit of Liu was considered capable of this function and it is “adapted to respond...” in that it has a surface that wires are connected to.

Regarding claim 49 see the rejection of claim 1 above. Regarding the limitation of “the transformer being bonded or fused to the capacitor”, Liu discloses this as well since the transformer 152 is a component of the blasting machine 32 just like the capacitor 106, 100 is part of the blasting machine.

Regarding claim 8, Liu discloses wherein the initiator comprises a bridge wire (see rejection of claim 1 above).

Regarding claim 56, see the rejection of claim 8 above.

Claims 15-21, 28-29, 31, and 63-69 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Liu (US Patent No. 6470803 B1).

Regarding claims 15-21 and 28, Liu discloses a detonator assembly with an addressable chip (chip 92 – fig. 6) that can be programmed to perform anyone of the various functions recited in claims 15-21 and 28. Also, see the obviousness rejections regarding these claims in the "Claim Rejections - 35 USC 103" section below.

Regarding claim 29, Liu further discloses a detonator assembly comprising a housing (32 – fig. 1) adapted to house the unified integrated detonating unit. Also, see the obviousness rejections regarding this claim in the "Claim Rejections - 35 USC 103" section below.

Regarding claim 31, Liu discloses a detonator assembly wherein the housing is coupled with a detonating cord (30 – fig. 1) having a predetermined diameter. Also, see the obviousness rejections regarding this claim in the "Claim Rejections - 35 USC 103" section below.

Regarding claims 63-69, see the rejections of claims 15-21 above, respectively.

Alternatively, claims 1 and 49 are rejected under 35 U.S.C. 102(b) as being anticipated by Turano (US Patent No. 5436791).

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Regarding claim 1, Turano discloses a detonator assembly (fig. 1), comprising: a capacitor (48 – fig. 4); an initiator (16 - fig. 4) electrically connected to the capacitor (48 – fig. 4), the initiator (16 - fig. 4) being bonded or fused to the capacitor (48 – fig. 4); a transformer (102 – fig. 4) mechanically and electrically connected to the capacitor (48 – fig. 4); and an addressable chip (85 – fig. 4) mechanically and electrically connected to the transformer, wherein the capacitor, initiator, transformer, and addressable chip form a unified integrated detonating unit (218, 216, 212 – fig. 1) adapted to respond to a command communicated from a remote source to activate an explosive (wireline 220 includes electrical conductors for providing electrical signals from the surface downhole to perforating gun 208 – col. 3 lines 60-64).

Regarding claim 49, see the rejection of claim 1 set forth above as anticipated by Turano.

New claims 71, 73-74, 75, and 77-78 are also rejected under 35 U.S.C. 102(b) as being anticipated by Turano (US Patent No. 5436791).

Regarding claim 71, Turano discloses the detonator assembly of claim 1, wherein the command is communicated to the unified integrated detonating unit via a stimulus comprising an electrical signal (col. 3 lines 60-64), a motion signal, a hydraulic pressure or pressure pulses.

Regarding claim 73, Turano discloses the detonator assembly of claim 1, wherein the remote source is disposed at the surface of a well (col. 3 lines 60-64).

Regarding claim 74, Turano discloses the detonator assembly of claim 1, wherein the unified integrated detonating unit is adapted to be disposed in its entirety

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downhole in the well (fig. 1 shows the detonator assembly disposed downhole in its entirety).

Regarding claims 75, 77-78 see the rejections of claims 71, 73-74, respectively set forth above.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.

4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 2-7, 9-12, 50-55, and 57-60 are rejected under 35 U.S.C. 103(a) as being unpatentable over Liu (US Patent No. 6470803 B1) in view of Brooks (US Patent Application Publication No. 2004/0003743 A1).

Regarding claim 2, Liu discloses the detonator assembly of claim 1 as set forth above except he does explicitly disclose a capacitor discharge unit, the capacitor discharge unit comprising the capacitor and a resistor. However, Brooks discloses within the same field of endeavor (detonators) the use of a capacitor discharge unit having a capacitor and a resistor (102 – fig. 2) in order to provide a means to store a charge/electricity and then discharge it at a preferred time (like a switch). Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the detonator assembly of Liu with a capacitor discharge unit similar to that of Brooks in order to provide a means to store a charge/electricity and then discharge it at a preferred time (like a switch).

Regarding claim 3, Brooks further discloses wherein the capacitor discharge unit further comprises a thick-film circuit (par. 7) that electrically connects the capacitor and the resistor.

Regarding claim 4, Brooks further discloses wherein the resistor comprises a bleeder resistor (par. 7) formed by thick-film deposition, the bleeder resistor adapted to bleed charge from the capacitor.

Regarding claim 5, Brooks further discloses wherein the resistor comprises a charging resistor (par. 7) formed by thick-film deposition, the charging resistor adapted to receive a charging voltage for the capacitor.

Regarding claim 6 Liu modified by Brooks discloses the claimed invention except for wherein the CDU further comprises an integrated "micro" switch (different types of switches disclosed in par. 7 and 14). It would have been an obvious matter of design choice to use a "micro" switch, since such a modification would have involved a mere change in the size of a component. A change in size is generally recognized as being within the level of ordinary skill in the art. *In re Rose*, 105 USPQ 237 (CCPA 1955). Further, in *Gardner v. TEC Systems, Inc.*, 725 F.2d 1338, 220 USPQ 777 (Fed. Cir. 1984), *cert. denied*, 469 U.S. 830, 225 USPQ 232 (1984), the Federal Circuit held that, where the only difference between the prior art and the claims was a recitation of relative dimensions of the claimed device and a device having the claimed relative dimensions would not perform differently than the prior art device, the claimed device was not patentably distinct from the prior art device.

Regarding claim 7, Liu further discloses a switch comprising a MOSFET (col. 9 line 57, col. 10 lines 19, 22).

Regarding claim 9, Brooks further discloses wherein the initiator comprises an exploding foil initiator fused directly to the capacitor discharge unit (fig. 2).

Regarding claim 10, Brooks further discloses a detonator comprising an explosive (HE 106 – fig. 2) proximate the initiator (EFI – fig. 2).

Regarding claim 11, Brooks further discloses wherein the capacitor is fabricated from a dielectric ceramic material (par. 33).

Regarding claim 12, Brooks further discloses wherein the resistor is selected from the group consisting of a thick-film resistor and a thin-film resistor (par. 36).

Regarding claims 50-55 see the rejections of claims 2-7 above, respectively.

Regarding claims 57-60 see the rejections of claims 9-12 above, respectively.

Claims 13 and 61 are rejected under 35 U.S.C. 103(a) as being unpatentable over Liu (US Patent No. 6470803 B1) in view of Mohr (US Patent No. 3963966).

Regarding claim 13, Liu discloses the detonator assembly of claim 1 as set forth above except he does not explicitly disclose wherein the transformer is a piezoelectric transformer. However, Mohr discloses within the same field of endeavor (igniters and detonators) that it is known in the art to use piezoelectric transformers (col. 2 line 61) in order to "generate a maximum electric energy" (col. 2 line 61-62). Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the detonator assembly of Liu by using a piezoelectric transformer similar to that of Mohr's in order to generate a maximum electric energy.

Regarding claim 61 see the rejection of claim 13 above.

Claims 14-21, 28-31, and 62-69 are rejected under 35 U.S.C. 103(a) as being unpatentable over Liu (US Patent No. 6470803 B1).

Regarding claim 14, Liu discloses the claimed invention except for a second transformer. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have second transformer, since it has been held that

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mere duplication of the essential working parts of a device involves only routine skill in the art. *St, Regis Paper Co. v. Bemis Co.*, 193 USPQ 8.

Regarding claims 14-21, 28-29, and 31 it has been held that the recitation that an element is “adapted to” perform a function is not a positive limitation but only requires the ability to so perform. It does not constitute a limitation in any patentable sense. *In re Hutchinson*, 69 USPQ 138. In this case, regarding claim 14, Liu already discloses a transformer as set forth above in the rejection of claims 14 and 1. In this case, regarding claims 15-21 and 28, since Liu discloses a chip (as set forth above in claim 1) that can be programmed, it would have been obvious to program it to perform any one of the various functions recited in claims 15-21 and 28.

Regarding claim 29, Liu further discloses a detonator assembly comprising a housing (32 – fig. 1) adapted to hold the detonating unit. Regarding the “adapted to” limitation see paragraph above about “adapted to” limitations.

Regarding claim 30, Liu discloses the claimed invention except he does not explicitly disclose wherein the housing has an outer diameter of approximately 0.28 inches. It would have been an obvious matter of design choice to make a housing with a diameter of approximately .28 inches, since such a modification would have involved a mere change in the size of a component. A change in size is generally recognized as being within the level of ordinary skill in the art. *In re Rose*, 105 USPQ 237 (CCPA 1955). Further, in *Gardner v. TEC Systems, Inc.*, 725 F.2d 1338, 220 USPQ 777 (Fed. Cir. 1984), *cert. denied*, 469 U.S. 830, 225 USPQ 232 (1984), the Federal Circuit held that, where the only difference between the prior art and the claims was a recitation of

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relative dimensions of the claimed device and a device having the claimed relative dimensions would not perform differently than the prior art device, the claimed device was not patentably distinct from the prior art device.

Regarding claim 31, Liu discloses a detonator assembly wherein the housing is coupled with a detonating cord (30 – fig. 1) having a predetermined diameter.

Regarding the “adapted to” limitation see paragraph above about “adapted to” limitations.

Regarding claims 62-69, see the rejections set forth above for claims 14-21, respectively.

Claims 22 and 70 are rejected under 35 U.S.C. 103(a) as being unpatentable over Liu (US Patent No. 6470803 B1) in view of Vaynshteyn (US Patent No. 6179064 B1).

Regarding claim 22, Liu discloses the detonator assembly of claim 21 except he does not explicitly disclose wherein the sensor is a pressure sensor. However, Vaynshteyn discloses within the same field of endeavor (detonators), that it is known in the art to use pressure sensors (col. 4 lines 10-12) in order to detect firing of a perforating gun (col. 4 line 12). Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the detonator assembly of Liu with a pressure sensor similar to that of Vaynshteyn's in order to detect a change in pressure of something such as the firing of a perforating gun.

Regarding claim 70, see the rejection set forth above in claim 22.

New claims 72 and 76 are rejected under 35 U.S.C. 103(a) as being unpatentable over Turano (US Patent No. 5436791).

Turano discloses the claimed invention except he does not explicitly disclose wherein the remote source is disposed in a well (Turano discloses that the remote source is at the surface of the well – col. 3 lines 60-64). It would have been obvious to one having ordinary skill in the art at the time the invention was made to place the remote source in the well, since it has been held that rearranging parts of an invention involves only routine skill in the art. *In re Japiske*, 86 USPQ 70.

Response to Arguments

Applicant's arguments with respect to the claims have been considered but are moot in view of the new ground(s) of rejection.

However, in phone interviews with Mr. Fred Pruner on 5/21/2010 and 5/25/2010, new possible proposed amendments were discussed such as these:

1. (Currently Amended) A detonator assembly, comprising: a capacitor; an initiator electrically connected to the capacitor, the initiator being bonded or fused to the capacitor; a transformer mechanically and electrically connected to the capacitor; and an addressable chip mechanically and electrically connected to the transformer, wherein the capacitor, initiator, transformer, and addressable chip form a unified integrated detonating unit adapted to respond to a command communicated from a remote source to activate an explosive; and a capacitor discharge unit comprising a capacitor, a resistor and an integrated microswitch adapted to couple the capacitor to the initiator when activated, wherein the unified integrated detonating unit is adapted to be disposed in its entirety downhole in the well.

49. (Currently Amended) A detonator assembly, comprising: a capacitor discharge unit comprising a capacitor, a resistor and a micro-switch adapted to couple the capacitor to the initiator when activated; an initiator mechanically and electrically connected to the capacitor; a transformer electrically connected to the capacitor, the transformer being bonded or fused to the capacitor; and an addressable chip mechanically and electrically connected to the transformer,

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wherein the capacitor, initiator, transformer, and addressable chip form a unified integrated detonating unit adapted to respond to a command communicated from a remote source to activate an explosive, wherein the unified integrated detonating unit is adapted to be disposed in its entirety downhole in the well.

The examiner would suggest that the applicant take the following points into consideration when deciding on the next possible steps of prosecution.

First, the examiner would like to point out that there would be potential antecedent basis issues with the "capacitor(s)" in each of these claims. Since claim 1 recites "a capacitor" in the beginning and then a "capacitor discharge unit comprising a capacitor" it's unclear which capacitor is being referred to in later parts of the claim.

Second, most of these elements in the proposed amendments are disclosed in Turano (US Patent No. 5436791). Turano also discloses the entire detonator being disposed downhole in the well.

During phone interviews, the issue of all of the components being "fused" together or integrated together on a single substrate was discussed. There is prior art on record such as US Patent 5725242 that show it is known in the art to form transformers on a substrate (see claim 14 of 5725242), as well as all of the other claimed components such as capacitors and initiators (or bridgewires). Therefore it would be obvious to place all of them on a substrate together so that they would be "fused" together.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP

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§ 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The prior art of record discloses various detonator assemblies.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael D. David whose telephone number is 571-270-3737. The examiner can normally be reached on Monday-Friday, 9:00am-6:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Carone can be reached on 571-272-6873. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/M. D. D./

Examiner, Art Unit 3641

5/27/2010

/Michael J. Carone/

Supervisory Patent Examiner,

Art Unit 3641